



Published in final edited form as:

Am Behav Sci. 2015 September ; 59(10): 1231–1245. doi:10.1177/0002764215591181.

The Long Term Recovery of New Orleans' Population after Hurricane Katrina

Elizabeth Fussell¹

¹Brown University, Providence, RI, USA

Abstract

Hurricane Katrina created a catastrophe in the city of New Orleans when the storm surge caused the levee system to fail on August 29, 2005. The destruction of housing displaced hundreds of thousands of residents for varying lengths of time, often permanently. It also revealed gaps in our knowledge of how population is recovered after a disaster causes widespread destruction of urban infrastructure, housing and workplaces, and how mechanisms driving housing recovery often produce unequal social, spatial and temporal population recovery. In this article, I assemble social, spatial and temporal explanatory frameworks for housing and population recovery and then review research on mobility – both evacuation and migration – after Hurricane Katrina. The review reveals a need for a comprehensive social, spatial and temporal framework for explaining inequality in population recovery and displacement. It also shows how little is known about in-migrants and permanent out-migrants after a disaster.

Keywords

New Orleans population; post-disaster displacement; in- and out-migration; housing

Introduction

Hurricanes Katrina and Rita provided scholars concerned with long-term disaster recovery a wealth of data about population mobility caused by extreme weather events, especially in the first year after the disaster. Since then, most data collection efforts have ended and little is known about the flows of in- and out-migrants and even less about the long-term displaced, even though migration drove New Orleans' population recovery. This gap in knowledge about disaster-induced migration differentials was noted by the National Research Council Committee on Disaster Research in the Social Sciences (2006, p. 80): "A few studies have examined highly aggregated data that could only discern net migration, not in-migration and out-migration separately. Thus, research is needed to assess the extent to which households decide to leave after disaster and the ways in which these migrating households differ from those who remain as well as from the in-migrants who replace them." The goal of this chapter is to review the research on population mobility and

recovery in New Orleans after Hurricane Katrina in order to assess knowledge of long-term disaster recovery has been improved and where gaps remain.

To accomplish this task, I restrict my review to the recovery of the population of the city of New Orleans and, to a lesser extent, the surrounding metropolitan area, and to those who were displaced from the city. Analyses of other urban places along the Gulf Coast that were affected by Hurricane Katrina were unlike New Orleans in many ways, making it challenging to incorporate them into a narrative about urban population displacement and recovery. There are also empirical limits on what can be said about the long-term displaced residents of New Orleans because they relocated throughout the U.S., making it impossible to generalize about their current locations and experiences of incorporation.

The Disaster and Its Effects on Population

Hurricane Katrina made landfall just east of New Orleans on August 29, 2005. The mandatory evacuation order issued the day before required that all residents leave the city. About 70 percent of the approximately 452,000 residents in the city of New Orleans in 2005 – whose borders are the same as Orleans Parish² – evacuated on their own in anticipation of Katrina's landfall (Elliott & Pais, 2006). After Katrina's storm surge breached the levee system, flooding 70 percent of the occupied housing units in the below-sea-level city, most remaining residents were evacuated under the auspices of the Federal Emergency Management Agency (FEMA). Nearly all residents except for emergency personnel and a few renegades vacated the devastated city throughout September 2005. Residents' returns were impeded by storm debris on the roadways, lack of utility services and floodwater, which reached the rooftops of single story houses in some neighborhoods. The "dewatering" of the below-sea-level city took six weeks and was prolonged when Hurricane Rita added rain to the floodwaters on September 25 (Kates et al., 2006). Widespread housing damage prevented residents' returns: 71.5 percent of the 188,251 housing units in Orleans were damaged, with 55.9 percent having major or severe damage (U.S. Department of Homeland Security, 2006). Residents' returns early on were determined by neighborhood flood depths and the extent of damage to their homes and neighborhoods, and later by the provision of rebuilding assistance both to individuals and to the City (Fussell, Sastry, & VanLandingham, 2010; Groen & Polivka, 2010; Seidman, 2013).

Based on historical case studies of post-disaster reconstruction, Kates and his colleagues (2006) extrapolated a time-line for New Orleans' reconstruction. They use the length of the emergency period – which lasted from the disaster event until the flood waters were removed 6 weeks later – to project the duration of the restoration and reconstruction periods, with each period lasting about 10 times longer than the previous. They estimated that the restoration period – in which the built environment is made functional – would last 60 weeks and the reconstruction period – in which the built environment is rebuilt, replaced or improved – would last between 8 and 11 years. Three years after Hurricane Katrina, when the reconstruction period was well underway, Colten and his colleagues (2008) altered the

²Louisiana parishes are equivalent to counties. I use the terms "city of New Orleans" and "Orleans Parish" interchangeably because they identify the same place.

recovery timeline by shortening the restoration period to reflect the strong commitment of federal resources and by lengthening the reconstruction period due to conflicts over the processes and goals of reconstruction. Whether New Orleans' recovery can ever be declared complete is stymied by the fact that no recovery goals by which to measure progress were ever agreed upon (Comfort, et al., 2010; Olshansky et al., 2008). To date, neighborhood recovery of housing and population varies widely, leading some to declare the housing recovery a secondary disaster (Adams, 2013; Gill, 2007; Kaiser Family Foundation, 2010; Seidman, 2013).

The population dimension of recovery began as soon as residents were allowed back into the city to take stock of their homes and possessions. Three population estimates dated December 3–4, 2005, January 1, 2006, and January 28–29, 2006 found that the increase in population over this two month period corresponds with “the return of utility services in most areas during December and the reopening of major universities and some primary and secondary schools in January” (Stone et al., 2007). The last of these rapid population counts estimated the city-wide population to be 210,000 (\pm 20,900), or about 37 percent of the 484,600 residents enumerated in the 2000 Census. This estimate included only residents who planned to spend 15 of the next 30 nights in a sampled home or in group quarters such as hotels, cruise ships or college dormitories. When the daytime residential population was included – friends, family, and workers who planned to spend two hours or more in the dwelling – the population estimate was 262,200 (\pm 33,500), or about 54 percent of the 2000 population. The difference between the resident and daytime population reflects daily population mobility at this time, as many residents rebuilt their homes but were unable to live in them. By July 2006, the U.S. Census estimated New Orleans' population to be 223,000 (Frey, Singer, & Park, 2007), although different estimation methods produce higher and lower figures (Plyer, Bonaguro, & Hodges, 2009). As repairs to urban infrastructure, businesses and residences were completed, New Orleans became one of the fastest growing U.S. cities with annual growth rates peaking at 17 percent between 2006 and 2007 and tapering to 1 percent between 2013 and 2014, as seen in Figure 1. However, this rapid growth of New Orleans' population masks the inequality in population recovery, which is certainly connected to inequality in housing recovery.

Explaining Inequality in Population Recovery

The post-World War II origins of sociological disaster research focused researchers' attention on social responses to the emergencies created by hazard events, but a disciplinary shift from functionalist to structuralist approaches refocused it on the pre-disaster political and economic conditions creating unequal vulnerability to natural and anthropogenic hazards (Bolin & Stanford, 1998; Wisner et al., 2004). Hurricane Katrina made a strong case for the value of a vulnerability approach in disaster research (Tierney, 2007). The vulnerability framework posits that economic, demographic and political processes affecting the distribution of resources among groups of people produce vulnerability to natural hazards which, in combination with a hazard, create a disaster (Wisner et al., 2004, p. 52). The Matthew effect (Merton, 1968) is a guiding hypothesis in this approach: Pre-disaster inequality is exacerbated by differentials in disaster impacts and institutional and social responses. This hypothesis is based on observational studies of changes that occur between

pre-disaster normal life, the emergency period and the recovery of normal life. However, most disaster research focuses on the short-term emergency response because both scholarly and public attention tends to fade with time. To identify mechanisms that produce long-term inequality in disaster recovery, more research is needed that spans the emergency period and follows all affected residents for multiple years.³

The Matthew effect is also produced when disasters create attractive opportunities, especially for government planners and community members interested in “building back better” and for business elites who seek to take advantage of redevelopment opportunities in devastated areas (Birkmann et al., 2010; Klein, 2008; Olshansky et al., 2008; Vale & Campanella, 2005). Local governments are best positioned to invest in local development if substantial external funds are directed toward the recovery, national and local leaders support recovery efforts, an urban development or disaster recovery plan already exists and community residents participate in the recovery process (Haas et al., 1977; Seidman, 2013).⁴ Private land developers and construction firms also grow as a result of the newly released capital resources. In contrast, the groups that experienced the greatest losses are least well positioned to take advantage of emergent opportunities. Unequal investments are most starkly apparent in housing recovery, a critical pre-condition for population recovery (Comerio, 1998). Disasters tend to disproportionately damage rental and low-income housing, which also tend to be rebuilt more slowly, if at all, while owner-occupied housing is typically repaired and rebuilt quickly (Bolin & Stanford, 1998; Comerio, 1998; Fothergill & Peek, 2004; Fothergill et al., 1999; Peacock et al., 2014; Zhang & Peacock, 2010). This “homeowner bias” in post-disaster housing recovery is attributed to the more efficient delivery of insurance payments and federal disaster assistance to homeowners.

Hurricane Katrina motivated scholars to build explanatory frameworks for the social, spatial and temporal variability observed during the recovery. Olshansky and colleagues (2012) argue that a disaster produces sudden and intense demand for capital replacement, such as home and business construction and repair of utilities and urban infrastructure, demand which varies only slightly during normal times. This temporal compression of demand for capital replacement competes with other more deliberate and less profitable collective goals, such as building affordable housing, improving neighborhoods and mitigating hazards (Olshansky & Chang, 2009). The capacity of market-based insurance companies to deliver payments to homeowners, and homeowners’ own savings, gives homeowners a decisive advantage in this competition. Several factors slow the recovery of rental housing, particularly affordable and multi-unit rental housing: (1) original construction materials for rental units, particularly multi-unit buildings, are often low quality and poorly maintained and therefore subject to greater damage; (2) costs of repair are greater and disaster assistance typically becomes available later for rental properties owners; and (3) owners may try to make their properties more profitable by upgrading or repurposing them (Comerio, 1998). In this way, temporal compression accounts for some of the variation in timing of housing

³For more on socioeconomic characteristics in New Orleans and their facilitation of post-disaster crime in the short and long term, see Frailing, Harper and Serpas’ article in this issue.

⁴For more on participation of elites in building resiliency in the long term, see Hobor’s article in this issue.

recovery, promoting the return of more socioeconomically advantaged homeowners over socioeconomically disadvantaged renters.

Spatial variation in housing recovery depends on neighborhood property values and a neighborhoods' proximity to valuable cultural and economic features. Pais and Elliott (2008) characterize the sociopolitical ecology of disaster recovery as a "recovery machine" – a coalition of pro-growth business elites and local politicians with substantial material interests in local economic development who capitalize on the in-flow of federal and private insurance money after a disaster. They analyze four regions affected by "billion-dollar" hurricanes in the early 1990s and find that although populations and housing stock tend to increase, this growth is not evenly distributed. In the severely affected areas, population growth occurs disproportionately among socioeconomically advantaged groups, specifically non-Hispanic whites and older adults, while in the less affected areas population growth is produced by in-migration of socioeconomically disadvantaged groups, such as racial minorities and low-income households. Similarly, Peacock et al. (2014) found that after Hurricanes Andrew and Ike owner-occupied housing and housing in higher-income neighborhoods suffered less damage and recovered more quickly, while multifamily housing (often rental housing) recovers more slowly and is susceptible to turnover and repurposing. This spatial unevenness complements the temporal variability in housing recovery, and hence, population recovery.

Because of these inequalities in housing and population recovery, I expect that social, temporal and spatial inequalities will also be observable in population mobility after a hazard event. Three types of mobility may occur: evacuation and in- or out-migration. Evacuation occurs in anticipation of the primary hurricane hazards (wind, precipitation, storm surge and flooding) or in response to the hurricane's primary and secondary hazards (power loss, residential damage and destruction). While pre-event evacuation protects people against primary hazard impacts, their homes are exposed to both primary and secondary hazards and therefore at risk of damage. Typically evacuations last only days or weeks, but may be longer if displaced residents lose access to housing. The complete evacuation of New Orleans and the widespread loss of access to housing after Hurricane Katrina was unusual and meant that the in-migration or return decision occurred from the evacuation destination. More commonly, housing is damaged but habitable, and residents decide whether to stay and rebuild in the disaster-affected area. In either case, the decision is informed by access to resources and the benefits, costs and perceived risks of continued residence in the disaster-affected place, although poverty often immobilizes people in a post-disaster location since any migration is costly (Black et al., 2013). In the case of Hurricane Katrina, the scale of population displacement and the duration of housing recovery revealed the limits of existing frameworks for understanding variation in population mobility after a disaster.

Vulnerability to Displacement: Evacuation and Migration Outcomes After Hurricane Katrina

New Orleans' residents were unequally vulnerable to disaster-driven mobility long before Hurricane Katrina ever formed. Land development patterns and the clustered nature of

human settlements exposed some sociodemographic groups to greater flood risk (Campanella, 2006; Logan, 2006). Social vulnerability complements this place vulnerability because residents of more vulnerable places are often socially marginalized groups with fewer resources to prepare for and cope with disaster impacts (Cutter et al., 2006; Finch, Emrich, & Cutter, 2010; Laska & Morrow, 2006/7). These socially vulnerable groups are often low-income households and individuals, women and members of female-headed households with children and racial and ethnic minorities (Enarson, 2012; Fothergill et al., 1999; Fothergill & Peek, 2004; Peacock et al., 2014; Thornton and Voigt, 2012). Using a place-based social vulnerability index, Cutter and her colleagues (2003) show that New Orleans was one of the most socially vulnerable Katrina-affected counties or parishes with substantial variation within the city (Cutter et al., 2006; Finch et al., 2010). Socially vulnerable census tracts had higher scores on measures of socioeconomic disadvantage (e.g., percentages of African American residents, poor households, service sector employees, unemployed, women, children under age 5 or women in the labor force) and housing disadvantage (percentage of high density housing units, high housing unit density and renters) (Finch et al., 2010). Although these factors suggest the underlying processes generating hazard vulnerability, they do not expose the mechanisms through which hazards produce housing and population loss or population mobility.

Unequal Resources and Evacuation Outcomes: To Seek Shelter or Shelter in Place?

Media images gave the impression that those who did not evacuate prior to the flood were disproportionately impoverished African Americans. Social scientists complicated this picture: race, class, age, gender, family statuses and social network composition significantly differentiated the evacuation timing of Gulf Coast residents (Elliott & Pais, 2006; Fussell, 2006; Groen & Polivka, 2010; Haney et al., 2010; Thiede & Brown, 2013). For example, a Gallup survey of adult evacuees registered with the Red Cross conducted one month after Hurricane Katrina found that 70 percent of New Orleanians had evacuated before the storm, 25 percent evacuated during or after the storm, and 5 percent never evacuated. Low-income residents and men were more likely to have evacuated during or after the Hurricane, while African Americans were the majority of the small group who never evacuated. One of the most important factors that was not measured by any surveys was access to transportation: in 2005, 26 percent of New Orleans households did not own a vehicle compared to just nine percent for the nation (U.S. Census, 2005a). Consistent with the vulnerability approach, those with more resources –geographically diverse social networks, higher incomes, more education and access to transportation – evacuated before the storm hit, and those with the fewest resources sheltered in place or in shelters of last resort.

Risk perception and response are also important in understanding why people may not have evacuated, although these are correlated with lack of resources (Trainor, Donner, & Torres, 2006). A pre-Katrina survey of New Orleans residents assessing their evacuation intentions found that after accounting for risk perception, prior evacuation experience and attention to weather-related warnings, there were no socioeconomic differences (Burnside, Miller, &

Rivera, 2007). A Gallup survey of Katrina evacuees registered with the Red Cross, as close to a representative sample as is possible in a post-disaster scenario, found that 49 percent of New Orleanians who did not evacuate said they did not think that the hurricane would be as bad as it was and 21 percent reported they lacked finances or a car that would have allowed them to evacuate (Pais & Elliott, 2006). A more disadvantaged group of Katrina evacuees surveyed in Houston area shelters found that half had not heard an evacuation order or had heard an order that lacked clear instructions. The main reasons given by those who did not evacuate prior to the storm for not leaving were the lack of a car or another way to leave (34 percent), underestimating how bad the storm would be (28 percent) or being physically unable or caring for someone physically unable to leave (12 percent) (Brodie et al., 2006). Evidently, risk perception and resource shortages combined to prevent compliance with the pre-disaster mandatory evacuation order.

Risk perception is influenced by the fact that New Orleans residents had experienced hurricane warnings before, with many close calls and non-events but very rarely a direct hit. Further, it was not the weather event itself but the flood caused by the failure of the levees that launched so many evacuees on housing trajectories involving multiple combinations of short-term, long-term, replacement and reconstructed housing (Levine, Esnard, & Sapat, 2007). The 1.2 million residents who fled their homes overwhelmed governmental capacity to provide emergency shelter and transition those whose homes were damaged or destroyed into temporary shelters and housing. The Gallup survey of evacuees gives a sense of residents' different post-disaster housing trajectories one month after the storm. At this point most emergency shelters had closed and shelter residents had transitioned to other housing. Among New Orleanians, 42 percent were in someone else's home, 53 percent were in an apartment, hotel, or shelter and only five percent were in their pre-Katrina home (Pais & Elliott, 2006). The implications of these post-disaster housing trajectories for a range of post-disaster outcomes – mental and physical health, employment, children's well-being and education – is an area in which more research is needed to inform the redesign of sheltering and replacement housing policies (Levine, Esnar, & Sapat, 2007; Mitchell, Esnard, & Sapat, 2011).

Unequal Resources and Migration Outcomes: Return or Resettle?

The social, spatial and temporal dimensions of the potential for return is succinctly illustrated in the reopening of New Orleans' neighborhoods. In September 2006, after watching their city flood, displaced New Orleanians learned they would not be allowed to return home until the government declared their neighborhood for open for occupancy. Neighborhood reopenings depended on the amount of flood and wind damage and the duration of debris removal and utility restoration and, perhaps most importantly, the resolution of highly political planning decisions about neighborhood investments (Olshansky et al., 2008). Consequently, timing of return migration coincided with spatial variability in housing recovery and social vulnerability. The first neighborhoods reopened were also least damaged neighborhoods that tended to be located in the sliver of high ground near the Mississippi River, where property values were high and more socially advantaged residents concentrated; the last to be reopened were the low-lying and less valuable neighborhoods closer to Lake Ponchartrain, where more socially disadvantaged populations

resided. Two notable exceptions to this pattern were the majority African American and low-income Lower Ninth Ward, which although close to the Mississippi River, was inundated when the Industrial Canal levee broke, and the majority white, high-income Lakeview neighborhood near Lake Ponchartrain, which suffered deep floods. Despite these exceptions, residents' returns were stratified by neighborhood socioeconomic characteristics, flood depth and housing damage (Finch, Emrich, & Cutter, 2010; Kamel, 2012; Wang, Tang, & Wang, 2014).

The same multi-dimensional dynamic played out in the dispersal of private and public homeowners' insurance funds. Homeowners with private insurance received payments relatively quickly and reliably so they could confidently make decisions about rebuilding or relocating. In contrast, the federal disaster assistance distributed to homeowners through Louisiana's Road Home Program (RHP) were only dispersed several years after the disaster with relatively meager grant amounts determined through convoluted and evolving rules (U.S. GAO, 2010). Briefly, the RHP provided up to \$150,000 per damaged home with funds to be used for rebuilding and flood mitigation or to compensate homeowners who chose to sell their properties to a state land trust and relocate (very few homeowners chose this option). The grant amounts for rebuilding depended on the lesser of two amounts: the cost of rebuilding the damaged home or the pre-storm value of the property. Consequently, homeowners in neighborhoods with lower property values received smaller grants even though their homes would cost as much to rebuild as a comparable home in a neighborhood with higher values (Green & Olshansky, 2012).

The housing recovery process for renters was also stratified on all three dimensions, although the spatial dimension extended well beyond New Orleans and the metropolitan area. For renters, there are three ways to lose housing access after a disaster (Comerio, 1998). First, rental housing tends to be lower quality and therefore more susceptible to damage that prevents re-occupancy. Second, re-occupancy is prohibited if a landlord cannot repair damage in a timely fashion, which may occur due to insufficient funds or a decision to upgrade the property. Finally, loss of rental housing units and increased demand in New Orleans inflated rental housing costs and made relocation to more affordable housing markets attractive, especially for low-income renters. Because 50 percent of New Orleans' occupied housing units were rented in 2004, these dynamics influenced much of the population loss, especially for socially vulnerable groups that are more likely to rent: 57 percent of African American householders rented, 81 percent of householders with below poverty incomes rented, 62 percent of female headed householders rented and 87 percent of female headed householders with below poverty incomes rented (U.S. Census, 2005b). Residents of subsidized rental housing – who were mostly female-headed householders and their children – lost access to affordable housing when the Housing Authority of New Orleans decided to redevelop four large public housing complexes for mixed income housing developments (Mitchell, Esnard, & Sapat, 2012). Thus, temporal compression in the New Orleans rental housing market channeled the most vulnerable renters out of the city and made their potential for return contingent on the small, slow-growing supply of affordable rental housing. In short, both homeowners and renters experienced socially, spatially and temporally stratified processes of permanent housing re-occupancy or replacement, with the most vulnerable experiencing the slowest return rates or never returning.⁵

These dynamics are reflected in New Orleans' demographic composition in the first year after Hurricane Katrina. By mid-year 2006, New Orleans' population was older, more educated and less poor, with fewer renters and fewer households with children. Out-migrating households differed in their destinations according to their demographics: non-Hispanic whites, higher-income households, older adults (40+) and native Louisianans tended to relocate closer, often within the metropolitan area, while non-Hispanic African Americans, lower-income households, younger adults (25–39) and non-native Louisianans tended to move further away, to places like Harris and Dallas counties in Texas (Frey et al., 2007; Sastry & Gregory, 2014). Furthermore, non-African American and college-educated residents returned sooner, over half within the first four months after Hurricane Katrina, compared to African Americans and residents without a college degree, for whom only half had returned by 14 months (Fussell et al., 2010). After the first anniversary of Hurricane Katrina, it became more difficult to identify pre-Katrina residents in federal data sources and so less is known about the locations and characteristics of pre-Katrina New Orleans residents; however, rapid growth in the city's size and trends toward the approximate pre-Katrina age, sex, and racial composition suggests that displaced residents have continued to return. Most analyses after the first year focus on differentials in neighborhood repopulation, capturing the social, spatial, and temporal dimensions of recovery, but do not focus on the individual-level determinants of return migration.

Differentials in neighborhood population recovery remained large as reconstruction proceeded. In 2008, more socially vulnerable pre-Katrina neighborhoods still had greater population losses, and the newly available homeowner rebuilding assistance grants did not appear to be speeding up repopulation in more damaged neighborhoods (Finch et al., 2010). By 2010, those neighborhoods with the greatest population losses were those that had more pre-Katrina social vulnerability (minority populations, low-income households), more multi-unit residences, rental units and subsidized housing, had experienced more housing damage, and had received lower levels of FEMA assistance (Kamel, 2012; Wang et al., 2014). These studies indicate that in the first five years after Hurricane Katrina, disaster assistance was not able to overcome the differential in recovery between more and less socially vulnerable neighborhoods. However, between 2010 and 2013, the fastest growing neighborhoods were those that had been slowest to recover in earlier years (Mack & Plyer, 2014). New analyses will reveal the processes driving this growth, such as the reopening of former public housing developments, the lagged effect of rebuilding assistance and neighborhood turnover and gentrification by new residents.

New residents were attracted to jobs and opportunities generated by the recovery economy and changed the sociodemographic composition of the city. Growth in the Latino population – from 3.1 percent in 2005 to 5.5 percent in 2013 – was driven mainly by the construction boom (Fussell, 2009). Other in-migrant groups were less easily identifiable by a particular demographic trait, although young professionals, artists and others were attracted by opportunities in the revitalized economy (Ehrenfeucht & Nelson, 2012). A 2010 survey found that nine percent of New Orleans residents had not been residents at the time of

⁵For more on inequities in the post-Katrina rebuilding process in New Orleans, see Gotham's article in this issue.

Hurricane Katrina (Kaiser Family Foundation, 2010). In the years after Hurricane Katrina, in-migration to the city tended to originate in counties that had been tied to New Orleans through out-migration before the hurricane, suggesting that these counties had received and then returned many long-term displaced residents and provided new in-migrants (Fussell, Curtis, & DeWaard, 2014). Post-disaster in-migration of newcomers is even less well studied than long-term disaster recovery, so it is not certain whether these groups are exacerbating, mitigating or having no net effect on social inequality.

The out-migration of more vulnerable pre-Katrina residents is likely to have mitigated inequality by decreasing the proportion of low-income households in New Orleans. This may account for New Orleans becoming “older, whiter and wealthier” in the first year after Katrina, but we know little about the long-term displaced. We have some indication from a representative sample of pre-Katrina adult New Orleans residents which found that those who had out-migrated during the four years after Katrina had a different sociodemographic profile than voluntary movers in a national sample. New Orleans’ out-migrants were more likely to be African American and to have been unemployed in 2005 and were less likely to be young adults than were movers nationwide. Surprisingly, men and women were equally likely to have out-migrated from New Orleans and although New Orleans’ out-migrants more likely to be renters, this is also true among movers nationally, *ceteris paribus* (Rendall, Sastry, & Reeder, 2012). These findings diverge from the generalization that disaster-driven migrants are more likely to be female and renters, although they do support the contention that disaster-driven migrants are more likely to be minorities and economically disadvantaged. These differences may be due Katrina’s catastrophic proportions and the longer time frame of this study. Whatever the origin of the disparate findings, Hurricane Katrina has provided the data and impetus for researchers to untangle the spatial, temporal and socioeconomic dimensions of long-term population recovery and displacement.

Conclusion: Different Populations, Different Recoveries

New Orleans’ recovery of population and housing after Hurricane Katrina has tested generalizations about disaster impacts and recovery that were based on previous disasters. The vulnerability approach to understanding disaster impacts has informed much of the research agenda, yet it is difficult to draw robust conclusions given the methodological problems that plague disaster research, especially research seeking to make generalizations about population change. For example, only a few of the surveys have representative population samples, and those that do often lack the pre- and post-event measures and the types of measures needed to evaluate sources of variation in disaster impacts and recovery (Galea, Waxwell, & Norris, 2008). However, what is apparent from the literature on Hurricane Katrina is that the vulnerability approach is strengthened by sensitivity to spatial variation in disaster impacts and recovery as well as greater attention to temporal variation in recovery. A multidimensional – social, spatial and temporal – understanding of housing and population recovery after a disaster reveals that there are different mechanisms driving recovery for different segments of the population. By identifying these mechanisms, hazard mitigation and response and disaster recovery policies can be fine-tuned to meet the needs of different segments of the population without using socioeconomic categories – race, gender, age, income – as proxies for disaster recovery needs.

Acknowledgments

The author benefitted from National Institutes of Health Center Grant R24 HD041020 to the Population Studies and Training Center, Brown University.

References

- Adams, V. Markets of sorrow, labors of faith: New Orleans in the wake of Katrina. Durham, NC: Duke University Press; 2013.
- Birkmann J, Buckle P, Jaeger J, Pelling M, Setiadi N, Garschagen M, Fernando N, Kropp J. Extreme events and disasters: a window of opportunity for change? Analysis of organizational, institutional and political changes, formal and informal responses after mega-disasters. *Natural Hazards*. 2010; 55:637–655.
- Black R, Arnell NW, Adger WN, Thomas D, Geddes A. Migration, immobility and displacement outcomes following extreme events. *Environmental Science and Policy*. 2013; 27:32–43.
- Bolin, R.; Stanford, L. The Northridge earthquake: Vulnerability and disaster. New York, NY: Routledge; 1998.
- Brodie M, Weltzien E, Altman D, Blendon RJ, Benson JM. Experiences of Hurricane Katrina evacuees in Houston shelters: Implications for future planning. *American Journal of Public Health*. 2006; 96:1402–1408. [PubMed: 16571686]
- Burnside R, Miller DS, Rivera JD. The impact of information and risk perception on the hurricane evacuation decision-making of greater New Orleans residents. *Sociological Spectrum*. 2007; 27:727–740.
- Campanella, R. Geographies of New Orleans: Urban fabrics before the storm. Lafayette, LA: University of Louisiana Press; 2006.
- Colten C, Kates RW, Laska SB. Three years after Katrina: Lessons for community resilience. *Environment*. 2008; 50:36–47.
- Comerio, MC. Disaster hits home: New policy for urban housing recovery. Berkeley, CA: University of California Press; 1998.
- Comfort LK, Cigler BA, Birkland TA, Nance E. Retrospectives and prospectives on Hurricane Katrina: Five years and counting. *Public Administration Review*. 2010; 70:669–678.
- Cutter SL, Boruff BJ, Shirley WL. Social vulnerability to environmental hazards. *Social Science Quarterly*. 2003; 84:242–261.
- Cutter SL, Emrich CT, Mitchell JT, Boruff BJ, Gall M, Schmidtlein MC, Burton CG, Melton G. The long road home: Race, class, and recovery from Hurricane Katrina. *Environment*. 2006; 48:8–20.
- Ehrenfeucht R, Nelson M. Young professionals as ambivalent change agents in New Orleans after the 2005 hurricanes. *Urban Studies*. 2012; 50:825–841.
- Elliott JR, Pais J. Race, class, and Hurricane Katrina: Social differences in human responses to disaster. *Social Science Research*. 2006; 35:295–321.
- Enarson, E. Women confronting natural disaster: From vulnerability to resilience. Boulder, CO: Lynne Rienner Publishers; 2012.
- Finch C, Emrich CT, Cutter SL. Disaster disparities and differential recovery in New Orleans. *Population & Environment*. 2010; 31:179–202.
- Fothergill A, Peek LA. Poverty and disasters in the United States: A review of recent sociological findings. *Natural Hazards*. 2004; 32:89–110.
- Fothergill A, Maestas EGM, Darlington JD. Race, ethnicity, and disasters in the United States: A review of the literature. *Disasters*. 1999; 23:156–173. [PubMed: 10379098]
- Frey, WH.; Singer, A.; Park, P. Resettling New Orleans: The first full picture from the Census. The Brookings Institution; 2007.
- Fussell, E. Leaving New Orleans: Social stratification, networks, and hurricane evacuation. *Understanding Katrina: Perspectives from the Social Sciences*. 2006. Retrieved from: <http://understandingkatrina.ssrc.org>

- Fussell E. Hurricane chasers in New Orleans: Latino immigrants as a source of a rapid response labor force. *Hispanic Journal of Behavioral Sciences*. 2009; 31:375–394.
- Fussell E, Sastry N, VanLandingham M. Race, socio-economic status, and return migration to New Orleans after Hurricane Katrina. *Population & Environment*. 2010; 31:20–42. [PubMed: 20440381]
- Fussell E, Curtis K, DeWaard J. Recovery migration to the city of New Orleans after Hurricane Katrina: A migration systems approach. *Population & Environment*. 2014; 35:305–322. [PubMed: 24729651]
- Gabe, T.; Falk, G.; McCarty, M.; Mason, VM. Hurricane Katrina: Social-demographic characteristics of impacted areas. Congressional Research Service Report for Congress; November 4; 2005.
- Galea S, Waxwell AR, Norris F. Sampling and design challenges in studying the mental health consequences of disasters. *International Journal of Methods in Psychiatric Research*. 2008; 17:21–28.
- Gill DA. Secondary trauma or secondary disaster? Insights from Hurricane Katrina. *Sociological Spectrum*. 2007; 27:613–632.
- Green TF, Olshansky RB. Rebuilding housing in New Orleans: The Road Home Program after the Hurricane Katrina disaster. *Housing Policy Debate*. 2012; 22:75–99.
- Groen JA, Polivka AE. Going home after Hurricane Katrina: Determinants of return migration and changes in affected areas. *Demography*. 2010; 47:821–844. [PubMed: 21308560]
- Haas, JE.; Kates, RW.; Bowden, MJ., editors. Reconstruction following disaster. Cambridge, MA: MIT Press; 1977.
- Haney, TJ.; Elliott, JR.; Fussell, E. Families and hurricane response: Risk, roles, resources, race and religion. In: Brunson, D.; Overfelt, D.; Picou, JS., editors. The sociology of Katrina: Perspectives on a modern catastrophe. 2. Lanham, MD: Rowman & Littlefield; 2010. p. 77-102.
- Kates RW, Colten CE, Laska S, Leatherman SP. Reconstruction of New Orleans after Hurricane Katrina: A research perspective. *Proceedings of the National Academy of Science*. 2006; 103:14653–14660.
- Kaiser Family Foundation. New Orleans five years after the storm: A New disaster amid recovery. 2010. Retrieved from: <http://kff.org/other/poll-finding/new-orleans-five-years-after-the-storm-a-new-disaster-amid-recovery/>
- Kamel N. Marginalisation, federal assistance and repopulation patterns in the New Orleans metropolitan area following Hurricane Katrina. *Urban Studies*. 2012; 49:3211–3231.
- Klein, N. The shock doctrine: The rise of disaster capitalism. New York, NY: Henry Holt and Company, Inc; 2008.
- Laska S, Morrow BH. Social vulnerabilities and Hurricane Katrina: An unnatural disaster in New Orleans. *Marine Technology Society Journal*. 2006/7; 40:16–26.
- Levine JN, Esnard AM, Sapat A. Population displacement and housing dilemmas due to catastrophic disasters. *Journal of Planning Literature*. 2011; 22:3–15.
- Logan, JR. The impact of Katrina: Race and class in storm-damaged neighborhoods. 2006. Retrieved from: www.s4.brown.edu/katrina/report.pdf
- Mack, V.; Plyer, A. Neighborhood growth rates: Growth continues through 2014 in New Orleans neighborhoods. The Data Center. 2014. Retrieved from: <http://datacenterresearch.org>
- Merton TG. The Matthew effect in science. *Science*. 1968; 159:56–63.
- Mitchell CM, Esnard AM, Sapat A. Hurricane events, population displacement, and sheltering provision in the United States. *Natural Hazards Review*. 2012; 13:150–161.
- National Research Council Committee on Disaster Research in the Social Sciences. Facing Hazards and Disasters: Understanding Human Dimensions. Washington, DC: The National Academies Press; 2006.
- Olshansky RB, Johnson LA, Horne J, Nee B. Planning for the Rebuilding of New Orleans. *Journal of the American Planning Association*. 2008; 74:273–287.
- Olshansky RB, Chang S. Planning for disaster recovery: Emerging resource needs and challenges. *Progress in Planning*. 2009; 72:200–209.

- Olshansky RB, Hopkins LD, Johnson LA. Disaster and recovery: Processes compressed in time. *Natural Hazards Review*. 2012; 13:173–178.
- Pais J, Elliott JR. Places as recovery machines: Vulnerability and neighborhood change after major hurricanes. *Social Forces*. 2008; 86:1415–1453.
- Peacock WG, Van Zandt S, Zhang Y, Highfield WE. Inequities in long-term housing recovery after disasters. *Journal of the American Planning Association*. 2014; 80:356–371.
- Phillips, BD. *Qualitative disaster research: Understanding qualitative research*. New York, NY: Oxford University Press; 2014.
- Plyer A, Bonaguro J, Hodges K. Using administrative data to estimate population displacement and resettlement following a catastrophic U.S. disaster. *Population & Environment*. 2010; 31:150–175. [PubMed: 20174436]
- Rendall, MS.; Sastry, N.; Reeder, L. Long-term displacement from New Orleans after Hurricane Katrina. Paper presented at the Population Association of America annual meeting; New Orleans, LA. 2013.
- Sastry N, Gregory J. The location of displaced New Orleans residents in the year after Hurricane Katrina. *Demography*. 2014; 51:753–775. [PubMed: 24599750]
- Seidman, KF. *Coming home to New Orleans: Neighborhood rebuilding after Katrina*. New York, NY: Oxford University Press; 2013.
- Stone G, Lekht A, Burris N, Williams C. Data collection and communications in the public health response to a disaster: Rapid population estimate surveys and the daily dashboard in post-Katrina New Orleans. *Journal of Public Health Management Practice*. 2007; 13:453–460. [PubMed: 17762688]
- Thiede BC, Brown DL. Hurricane Katrina: Who stayed and why? *Population Research and Policy Review*. 2013; 32:803–824.
- Tierney KJ. From the margins to the mainstream? Disaster research at the crossroads. *Annual Review of Sociology*. 2007; 33:503–525.
- Thornton, W.; Voigt, L. Disaster rape: Vulnerability of women to sexual assaults during Hurricane Katrina. In: Harper, DW.; Frailing, K., editors. *Crime and criminal justice in disaster*. 2. Durham, NC: Carolina Academic Press; 2012. p. 123-156.
- Trainor, JE.; Donner, W.; Torres, MR. Learning from Catastrophe: Quick Response Research in the Wake of Hurricane Katrina. *Natural Hazards Center, University of Colorado at Boulder*; 2006. There for the storm: Warning, response, and rescue among nonevacuees; p. 307-326.
- U.S. Census Bureau. Table B08201: Household size by vehicles available. 2005a. Retrieved from: <http://factfinder.census.gov/>
- U.S. Census Bureau. American housing survey for the New Orleans metropolitan area: 2004. 2005b. Retrieved from: <https://www.census.gov/prod/2005pubs/h170-04-30.pdf>
- U.S. Census Bureau. Table 1. Intercensal Estimates of the Resident Population for Counties of Louisiana: April 1, 2000 to July 1, 2010. 2011
- U.S. Census Bureau. Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2013. 2014. Retrieved from: <http://www.census.gov>
- U.S. Census Bureau. Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2014. 2015. Retrieved from: <http://www.census.gov>
- U.S. Department of Homeland Security. Current Housing Unit Damage Estimates: Hurricanes Katrina, Rita, and Wilma. 2006. Retrieved from: www.huduser.org/publications/pdf/GulfCoast_Hsngdmgest.pdf
- U.S. Government Accountability Office. Disaster assistance: Federal assistance for permanent housing primarily benefited homeowners; Opportunities exist to better target rental housing needs. Report to Congressional Requesters GAO-10-17. 2010. Retrieved from: <http://www.gao.gov/products/GAO-10-17>
- Vale, LJ.; Campanella, TJ. *The resilient city: How modern cities recover from disaster*. Oxford, England: Oxford University Press; 2005.
- Wang F, Tang Q, Wang L. Post-Katrina population loss and uneven recovery in New Orleans, 2000–2010. *Geographical Review*. 2014; 104:310–327.

Wisner, B.; Blaikie, P.; Cannon, T.; Davis, I. At risk: Natural hazards, People's vulnerability, and disasters. 2. Oxford, England: Routledge Press; 2004.

Zhang Y, Peacock WG. Planning for housing recovery? Lessons learned from Hurricane Andrew. Journal of the American Planning Association. 2010; 76:5–24.

Biography

Elizabeth Fussell is an Associate Professor of Population Studies at Brown University. Prior to that, she was a postdoctoral fellow at the University of Pennsylvania Population Studies Center, an assistant professor at Tulane University and an associate professor at Washington State University. She is an expert in migration, especially from Mexico to the United States and in population change after disaster, especially Hurricane Katrina. She has published on these issues in the journals *Demography*, *Annual Review of Sociology*, *Social Science Quarterly*, *Social Science and Medicine*, *Population and Environment*, *Sociological Quarterly* and *Hispanic Journal of Behavioral Sciences*.

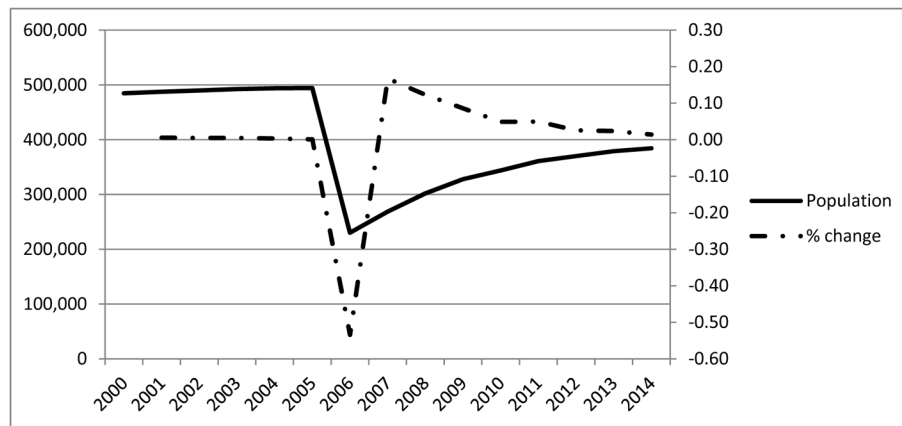


Figure 1.
Population change in Orleans Parish, 2000 to 2014